

SEQUENCE LISTING

<110> OLSON, ERIC  
SPENCER, JEFFREY A.

<120> METHODS AND COMPOSITIONS FOR STABILIZING MICROTUBULES  
AND INTERMEDIATE FILAMENTS IN STRIATED MUSCLE CELLS

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<141> 2004-02-10

<150> 09/908,988  
<151> 2001-07-18

<150> 60/219,020  
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<170> PatentIn Ver. 2.1

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gctccagagc gccgcggg atg aac ttc acg gtg ggt ttc aag ccg ctg cta 231  
Met Asn Phe Thr Val Gly Phe Lys Pro Leu Leu  
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ggg gat gcg cac aac atg gac aac ttg gag aag cag ctc att tgc ccc 279  
Gly Asp Ala His Asn Met Asp Asn Leu Glu Lys Gln Leu Ile Cys Pro  
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atc tgc ctg gag atg ttc tcc aag ccc gtg gtg atc ttg ccc tgc caa 327  
Ile Cys Leu Glu Met Phe Ser Lys Pro Val Val Ile Leu Pro Cys Gln  
30 35 40

cac aac ctg tgc cgc aag tgt gcc aac gac gtc ttc cag gcc tct aat 375  
His Asn Leu Cys Arg Lys Cys Ala Asn Asp Val Phe Gln Ala Ser Asn  
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cct ctg tgg caa tcc cgg ggc tcc aca acg gtg tct tca gga gga cgt 423  
Pro Leu Trp Gln Ser Arg Gly Ser Thr Thr Val Ser Ser Gly Gly Arg

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|   |   |     |     | 519  |
| gtc tat ggc ctg cag cg <sup>g</sup> aac ctg cta gtg gag aac atc att gac atc | Val Tyr Gly Leu Gln Arg Asn Leu Leu Val Glu Asn Ile Ile Asp Ile |     |     |      |
| 95  | 100   | 105 |     |      |
|   |   |     |     | 567  |
| tac aag cag gag tcc tcc cg <sup>g</sup> cca ctg cac gcc aag gct gaa cag cac | Tyr Lys Gln Glu Ser Ser Arg Pro Leu His Ala Lys Ala Glu Gln His |     |     |      |
| 110   | 115   | 120 |     |      |
|   |   |     |     | 615  |
| ctc atg tgt gag gag cac gag gac gag aag atc aac atc tac tgc ctg             | Leu Met Cys Glu Glu His Glu Asp Glu Lys Ile Asn Ile Tyr Cys Leu |     |     |      |
| 125   | 130   | 135 |     |      |
|   |   |     |     | 663  |
| agc tgc gag gtg ccc acc tgc tct ctc tgc aag gtt ttc ggc gcc cac             | Ser Cys Glu Val Pro Thr Cys Ser Leu Cys Lys Val Phe Gly Ala His |     |     |      |
| 140   | 145   | 150 | 155 |      |
|   |   |     |     | 711  |
| aag gac tgt gag gtg gcc cct ctg ccc acc att tac aaa cgc cag aag             | Lys Asp Cys Glu Val Ala Pro Leu Pro Thr Ile Tyr Lys Arg Gln Lys |     |     |      |
| 160   | 165   | 170 |     |      |
|   |   |     |     | 759  |
| agt gag ctg agc gat ggc atc gcg atg ctg gtg gcg ggc aat gac cgt             | Ser Glu Leu Ser Asp Gly Ile Ala Met Leu Val Ala Gly Asn Asp Arg |     |     |      |
| 175   | 180   | 185 |     |      |
|   |   |     |     | 807  |
| gtg cag gca gtg atc acc cag atg gag gag gtg tgc cag acc att gag             | Val Gln Ala Val Ile Thr Gln Met Glu Glu Val Cys Gln Thr Ile Glu |     |     |      |
| 190   | 195   | 200 |     |      |
|   |   |     |     | 855  |
| gac aac agc cgc aga cag aag caa ctg tta aac cag agg ttc gag acc             | Asp Asn Ser Arg Arg Gln Lys Gln Leu Leu Asn Gln Arg Phe Glu Thr |     |     |      |
| 205   | 210   | 215 |     |      |
|   |   |     |     | 903  |
| ctg tgc gcg gtt ttg gag gag cgc aag ggc gaa ctg ctt caa gca ctg             | Leu Cys Ala Val Leu Glu Glu Arg Lys Gly Glu Leu Leu Gln Ala Leu |     |     |      |
| 220   | 225   | 230 | 235 |      |
|   |   |     |     | 951  |
| gcc cgg gag cag gag aag ttg cag cgc gtg cgg ggc ctc atc cgc                 | Ala Arg Glu Gln Glu Glu Lys Leu Gln Arg Val Arg Gly Leu Ile Arg |     |     |      |
| 240   | 245   | 250 |     |      |
|   |   |     |     | 999  |
| cag tac gga gac cac ttg gag ggc tcc tca aag ctg gtg gag tcc gcc             | Gln Tyr Gly Asp His Leu Glu Gly Ser Ser Lys Leu Val Glu Ser Ala |     |     |      |
| 255   | 260   | 265 |     |      |
|   |   |     |     | 1047 |
| atc cag tcc atg gag gag ccg cag atg gct ctc tac ctc cag cag gca             | Ile Gln Ser Met Glu Glu Pro Gln Met Ala Leu Tyr Leu Gln Gln Ala |     |     |      |
| 270   | 275   | 280 |     |      |
|   |   |     |     | 1095 |
| aag gag ctg atc aac aag gtc ggg gca atg tcg aag gtg gag ctg gca             | Lys Glu Leu Ile Asn Lys Val Gly Ala Met Ser Lys Val Glu Leu Ala |     |     |      |
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Lys Cys Ala Asn Asp Val Phe Gln Ala Ser Asn Pro Leu Trp Gln Ser
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Cys Arg His Glu Val Val Leu Asp Arg His Gly Val Tyr Gly Leu Gln
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His Glu Asp Glu Lys Ile Asn Ile Tyr Cys Leu Ser Cys Glu Val Pro

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165                    170                    175  
  
Gly Ile Ala Met Leu Val Ala Gly Asn Asp Arg Val Gln Ala Val Ile  
180                    185                    190  
  
Thr Gln Met Glu Glu Val Cys Gln Thr Ile Glu Asp Asn Ser Arg Arg  
195                    200                    205  
  
Gln Lys Gln Leu Leu Asn Gln Arg Phe Glu Thr Leu Cys Ala Val Leu  
210                    215                    220  
  
Glu Glu Arg Lys Gly Glu Leu Leu Gln Ala Leu Ala Arg Glu Gln Glu  
225                    230                    235                    240  
  
Glu Lys Leu Gln Arg Val Arg Gly Leu Ile Arg Gln Tyr Gly Asp His  
245                    250                    255  
  
Leu Glu Gly Ser Ser Lys Leu Val Glu Ser Ala Ile Gln Ser Met Glu  
260                    265                    270  
  
Glu Pro Gln Met Ala Leu Tyr Leu Gln Gln Ala Lys Glu Leu Ile Asn  
275                    280                    285  
  
Lys Val Gly Ala Met Ser Lys Val Glu Leu Ala Gly Arg Pro Glu Pro  
290                    295                    300  
  
Gly Tyr Glu Ser Met Glu Gln Phe Ser Val Ser Val Glu His Val Ala  
305                    310                    315                    320  
  
Glu Met Leu Arg Thr Ile Asp Phe Gln Pro Gly Ala Ala Gly Asp Glu  
325                    330                    335  
  
Glu Asp Asp Asp Met Ala Leu Asp Gly Glu Glu Gly Asn Ala Gly Leu  
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| 1                   5                   10   |     |
| <br>aaa gag cag cag acc atg gat aac ttg gaa aag caa ctg atc tgt ccc<br>Lys Glu Gln Gln Thr Met Asp Asn Leu Glu Lys Gln Leu Ile Cys Pro | 160 |
| 15                 20                 25   |     |
| <br>atc tgc cta gag atg ttc acg aag cct gtg gtc att ctc cct tgc cag<br>Ile Cys Leu Glu Met Phe Thr Lys Pro Val Val Ile Leu Pro Cys Gln | 208 |
| 30                 35                 40   |     |
| <br>cac aac ctg tgc agg aaa tgt gcc agt gac atc ttc cag gcc tct aac<br>His Asn Leu Cys Arg Lys Cys Ala Ser Asp Ile Phe Gln Ala Ser Asn | 256 |
| 45                 50                 55   |     |
| <br>ccg tac tta ccc aca aga gga ggc acc acc gtg gca tca ggg ggc cgc<br>Pro Tyr Leu Pro Thr Arg Gly Thr Val Ala Ser Gly Gly Arg         | 304 |
| 60                 65                 70                 75  |     |
| <br>ttc cgc tgt ccc tcc tgc aga cat gag gtg gtg tta gac aga cat ggg<br>Phe Arg Cys Pro Ser Cys Arg His Glu Val Val Leu Asp Arg His Gly | 352 |
| 80                 85                 90   |     |
| <br>gtc tat gga ctg cag agg aac ctg ctc gtg gaa aac att att gat atc<br>Val Tyr Gly Leu Gln Arg Asn Leu Val Glu Asn Ile Ile Asp Ile     | 400 |
| 95                 100                 105   |     |
| <br>tat aag cag gaa tcc acc agg cca gaa aaa aaa ttg gac cag ccc atg<br>Tyr Lys Gln Glu Ser Thr Arg Pro Glu Lys Lys Leu Asp Gln Pro Met | 448 |
| 110                 115                 120  |     |
| <br>tgt gaa gag cat gaa gag gaa cgc atc aac atc tat tgt ctg aac tgt<br>Cys Glu Glu His Glu Glu Glu Arg Ile Asn Ile Tyr Cys Leu Asn Cys | 496 |
| 125                 130                 135  |     |
| <br>gaa gtg ccc acc tgt tcc ttg tgc aag gtt ttt ggc gcc cat aag gac<br>Glu Val Pro Thr Cys Ser Leu Cys Lys Val Phe Gly Ala His Lys Asp | 544 |
| 140                 145                 150                 155  |     |
| <br>tgc cag gtg gct ccc ctg act cat gtg ttc cag agg cag aag tca gag<br>Cys Gln Val Ala Pro Leu Thr His Val Phe Gln Arg Gln Lys Ser Glu | 592 |
| 160                 165                 170  |     |
| <br>ctc agt gat ggt att gct gta ctt gtg gga agc aac gat aga gtc cag<br>Leu Ser Asp Gly Ile Ala Val Leu Val Gly Ser Asn Asp Arg Val Gln | 640 |
| 175                 180                 185  |     |
| <br>ggg gtg atc agc cag ctg gag gac acc tgt aaa act att gag gag tgc<br>Gly Val Ile Ser Gln Leu Glu Asp Thr Cys Lys Thr Ile Glu Glu Cys | 688 |
| 190                 195                 200  |     |
| <br>tgc aga aag cag aaa cag gac ctg tgt gag aaa ttt gat cac cta tac<br>Cys Arg Lys Gln Lys Gln Asp Leu Cys Glu Lys Phe Asp His Leu Tyr | 736 |
| 205                 210                 215  |     |

|   |     |      |     |
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| ggc atc ctg gag gag aag act gaa atg acc caa gcc atc act cga     |     | 784  |     |
| Gly Ile Leu Glu Glu Arg Lys Thr Glu Met Thr Gln Ala Ile Thr Arg |     |      |     |
| 220   | 225 | 230  | 235 |
| aca cag gag gag aaa ctg gaa cat gtc cga act ctt atc agg aag tat |     | 832  |     |
| Thr Gln Glu Glu Lys Leu Glu His Val Arg Thr Leu Ile Arg Lys Tyr |     |      |     |
| 240   | 245 | 250  |     |
| tcc gat cac ctg gag aac gta tcc aag ttg gtg gag tca gga atc cag |     | 880  |     |
| Ser Asp His Leu Glu Asn Val Ser Lys Leu Val Glu Ser Gly Ile Gln |     |      |     |
| 255   | 260 | 265  |     |
| ttc atg gat gag ccc gaa atg gca gta ttt ctg cag aat gcc aag acc |     | 928  |     |
| Phe Met Asp Glu Pro Glu Met Ala Val Phe Leu Gln Asn Ala Lys Thr |     |      |     |
| 270   | 275 | 280  |     |
| ctg ttg caa aag atc gtg gaa gca tca aag gcg ttt cag atg gag aaa |     | 976  |     |
| Leu Leu Gln Lys Ile Val Glu Ala Ser Lys Ala Phe Gln Met Glu Lys |     |      |     |
| 285   | 290 | 295  |     |
| cta gaa caa ggt tat gag atc atg agc aac ttc act gtc aat ctc aat |     | 1024 |     |
| Leu Glu Gln Gly Tyr Glu Ile Met Ser Asn Phe Thr Val Asn Leu Asn |     |      |     |
| 300   | 305 | 310  | 315 |
| aga gaa gaa aaa att atc cgt gaa att gac ttt tct aga gaa gag gaa |     | 1072 |     |
| Arg Glu Glu Lys Ile Ile Arg Glu Ile Asp Phe Ser Arg Glu Glu Glu |     |      |     |
| 320   | 325 | 330  |     |
| gag gaa gaa gat gca gga gaa ata gat gaa gaa gga gaa gga gag gat |     | 1120 |     |
| Glu Glu Glu Asp Ala Gly Glu Ile Asp Glu Glu Gly Glu Gly Glu Asp |     |      |     |
| 335   | 340 | 345  |     |
| gca gta gaa gta gaa gag gca gaa aat gtt caa ata gca tct tca ggg |     | 1168 |     |
| Ala Val Glu Val Glu Ala Glu Asn Val Gln Ile Ala Ser Ser Gly     |     |      |     |
| 350   | 355 | 360  |     |
| gaa gag gag agt ctg gag aaa gct gca gag ccc tct cag ctt ccc gca |     | 1216 |     |
| Glu Glu Glu Ser Leu Glu Lys Ala Ala Glu Pro Ser Gln Leu Pro Ala |     |      |     |
| 365   | 370 | 375  |     |
| gag ctt cag gtc gcc cca gag cca cta cct gct tcc tct cca gaa ccg |     | 1264 |     |
| Glu Leu Gln Val Ala Pro Glu Pro Leu Pro Ala Ser Ser Pro Glu Pro |     |      |     |
| 380   | 385 | 390  | 395 |
| ttt tca tcc atg cca cct gct gca gat gtc ctg gtg aca cag ggg gag |     | 1312 |     |
| Phe Ser Ser Met Pro Pro Ala Ala Asp Val Leu Val Thr Gln Gly Glu |     |      |     |
| 400   | 405 | 410  |     |
| gtg gtg ccc att ggc tct cag cag acc aca cag tct gaa act tca ggc |     | 1360 |     |
| Val Val Pro Ile Gly Ser Gln Gln Thr Thr Gln Ser Glu Thr Ser Gly |     |      |     |
| 415   | 420 | 425  |     |
| cct tca gca gcg gaa act gcg gat ccc ttg ttt tac cct agt tgg tat |     | 1408 |     |
| Pro Ser Ala Ala Glu Thr Ala Asp Pro Leu Phe Tyr Pro Ser Trp Tyr |     |      |     |
| 430   | 435 | 440  |     |
| aaa ggc caa agc cgg aaa acc agc tcc aac cca cct tgc act cat ggg |     | 1456 |     |

|  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|--|
| Lys  | Gly | Gln | Ser | Arg | Lys | Thr | Ser | Ser | Asn | Pro | Pro | Cys | Thr | His | Gly  |  |
| 445  |     |     |     |     | 450 |     |     |     |     |     |     | 455 |     |     |      |  |
| agt gaa ggt ctg ggt caa ata ggg cct ctg ggc att gag gat tcc agt 1504     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| Ser Glu Gly Leu Gly Gln Ile Gly Pro Leu Gly Ile Glu Asp Ser Ser          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| 460  |     | 465 |     |     |     | 470 |     |     |     |     |     | 475 |     |     |      |  |
| gtg cag tcc gca gaa gtg gca gaa gcc gca acc aat gag cag gca gca 1552     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| Val Gln Ser Ala Glu Val Ala Glu Ala Ala Thr Asn Glu Gln Ala Ala          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| 480  |     |     | 485 |     |     |     | 490 |     |     |     |     |     |     |     |      |  |
| gtg agt ggt aag gag tct agt tca act gca gct acc tct cag att gga 1600     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| Val Ser Gly Lys Glu Ser Ser Ser Thr Ala Ala Thr Ser Gln Ile Gly          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| 495  |     |     | 500 |     |     | 505 |     |     |     |     |     |     |     |     |      |  |
| ttt gag gcc cct tct ccc cag gga cag tct gca gcc ttg ggg agt ggg 1648     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| Phe Glu Ala Pro Ser Pro Gln Gly Gln Ser Ala Ala Leu Gly Ser Gly          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| 510  |     | 515 |     | 520 |     |     |     |     |     |     |     |     |     |     |      |  |
| ggg ggg gtg atc ctg agc cag ctc gcc acg tct tct cct tct cct ggt 1696     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| Gly Gly Val Ile Leu Ser Gln Leu Ala Thr Ser Ser Pro Ser Pro Gly          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
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| Leu Asn Ser Leu Asn Glu  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| 540  |     | 545 |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
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| tttaattcca gatgacttat ctcactcatt gagaaaatga ttatgctca gAACAAATTAA 1924   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| cagaaaatac tcttctgaag aaacttgatc ttctgcaa at cttcatttg tgtgagaaac 1984   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
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| gtgccttttgc ttccctcct tagcattgca ggtggtaggt gatgttcagt gtcagttcca 2164   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| aactgaccga ttatcaaaa tatggagatt ggtcaactgac caaagctatg tagggactg 2224    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
| tagaggttcc ttccctatg gatgccatgg gtgcgcagac aggactttcc ttacatgtg 2284     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
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Lys Cys Ala Ser Asp Ile Phe Gln Ala Ser Asn Pro Tyr Leu Pro Thr  
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Arg Gly Gly Thr Thr Val Ala Ser Gly Gly Arg Phe Arg Cys Pro Ser  
65 70 75 80  
  
Cys Arg His Glu Val Val Leu Asp Arg His Gly Val Tyr Gly Leu Gln  
85 90 95  
  
Arg Asn Leu Leu Val Glu Asn Ile Ile Asp Ile Tyr Lys Gln Glu Ser  
100 105 110  
  
Thr Arg Pro Glu Lys Lys Leu Asp Gln Pro Met Cys Glu Glu His Glu  
115 120 125  
  
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130 135 140  
  
Ser Leu Cys Lys Val Phe Gly Ala His Lys Asp Cys Gln Val Ala Pro  
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Leu Thr His Val Phe Gln Arg Gln Lys Ser Glu Leu Ser Asp Gly Ile  
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Ala Val Leu Val Gly Ser Asn Asp Arg Val Gln Gly Val Ile Ser Gln  
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Gln Asp Leu Cys Glu Lys Phe Asp His Leu Tyr Gly Ile Leu Glu Glu  
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Arg Lys Thr Glu Met Thr Gln Ala Ile Thr Arg Thr Gln Glu Glu Lys  
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 Glu Ala Glu Asn Val Gln Ile Ala Ser Ser Gly Glu Glu Glu Ser Leu  
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 Glu Lys Ala Ala Glu Pro Ser Gln Leu Pro Ala Glu Leu Gln Val Ala  
 370 375 380  
 Pro Glu Pro Leu Pro Ala Ser Ser Pro Glu Pro Phe Ser Ser Met Pro  
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 Pro Ala Ala Asp Val Leu Val Thr Gln Gly Glu Val Val Pro Ile Gly  
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 Ser Gln Gln Thr Thr Gln Ser Glu Thr Ser Gly Pro Ser Ala Ala Glu  
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 Thr Ala Asp Pro Leu Phe Tyr Pro Ser Trp Tyr Lys Gly Gln Ser Arg  
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 Lys Thr Ser Ser Asn Pro Pro Cys Thr His Gly Ser Glu Gly Leu Gly  
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 Gln Ile Gly Pro Leu Gly Ile Glu Asp Ser Ser Val Gln Ser Ala Glu  
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 Val Ala Glu Ala Ala Thr Asn Glu Gln Ala Ala Val Ser Gly Lys Glu  
 485 490 495  
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 Pro Gln Gly Gln Ser Ala Ala Leu Gly Ser Gly Gly Val Ile Leu  
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gaagcctgtg gtcattctcc ctgccagca caacctgtgc aggaaatgtg cggggcccc 240  
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Met Asp Tyr Lys Ser Ser Leu Ile Pro Asp Gly Asn Ala Met Glu Asn  
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Leu Glu Lys Gln Leu Ile Cys Pro Ile Cys Leu Glu Met Phe Thr Lys  
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Asn Asp Ile Phe Gln Ala Ala Asn Pro Tyr Trp Thr Asn Arg Gly Gly  
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tca gtg tcc atg tct gga ggt cgt ttc cgt tgc ccc tcg tgc cgc cat 538  
Ser Val Ser Met Ser Gly Gly Arg Phe Arg Cys Pro Ser Cys Arg His  
65 70 75 80  
gaa gtg atc atg gac cgg cac ggg gtg tac ggc ctg cag agg aac ctg 586  
Glu Val Ile Met Asp Arg His Gly Val Tyr Gly Leu Gln Arg Asn Leu  
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Leu Val Glu Asn Ile Ile Asp Ile Tyr Lys Gln Glu Cys Ser Ser Arg  
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ccc ctg cag aaa ggc agc cac ccg atg tgc aag gaa cac gaa gac gag 682  
Pro Leu Gln Lys Gly Ser His Pro Met Cys Lys Glu His Glu Asp Glu  
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Lys Ile Asn Ile Tyr Cys Leu Thr Cys Glu Val Pro Thr Cys Ser Leu  
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|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |     |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|
| Cys   | Lys | Val | Phe | Gly | Ala | His | Gln | Ala | Cys | Glu | Val | Ala | Pro | Leu | Gln  |     |
| 145   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 160 |
| agc atc ttc caa gga cag aag act gag ctg agt aac tgc atc tcc atg             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 826  |     |
| Ser   | Ile | Phe | Gln | Gly | Gln | Lys | Thr | Glu | Leu | Ser | Asn | Cys | Ile | Ser | Met  |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 165 |
| 170   |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 175  |     |
| ctg gtg gcg ggg aac gac cga gtg cag acg atc atc tct cag ctg gag             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 874  |     |
| Leu   | Val | Ala | Gly | Asn | Asp | Arg | Val | Gln | Thr | Ile | Ile | Ser | Gln | Leu | Glu  |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 180 |
| 185   |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 190  |     |
| gac tcg tgc aga gtg acc aag gag aat agc cac cag gtg aag gag gag             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 922  |     |
| Asp   | Ser | Cys | Arg | Val | Thr | Lys | Glu | Asn | Ser | His | Gln | Val | Lys | Glu | Glu  |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 195 |
| 200   |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 205  |     |
| ctg agt cag aag ttt gac acc ctc tac gcc atc ctg gat gag aag aag             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 970  |     |
| Leu   | Ser | Gln | Lys | Phe | Asp | Thr | Leu | Tyr | Ala | Ile | Leu | Asp | Glu | Lys | Lys  |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 210 |
| 215   |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 220  |     |
| agc gag ctg ctg cag cg <sup>g</sup> atc acg cag gag cag gag gag aag ctg ggc |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1018 |     |
| Ser   | Glu | Leu | Leu | Gln | Arg | Ile | Thr | Gln | Glu | Gln | Glu | Lys | Leu | Gly |      |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 225 |
| 230   |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 235  |     |
| 240   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |     |
| ttc atc gag gct ctg atc ctc cag tac agg gag cag ctg gaa aag tcc             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1066 |     |
| Phe   | Ile | Glu | Ala | Leu | Ile | Leu | Gln | Tyr | Arg | Glu | Gln | Leu | Glu | Lys | Ser  |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 245 |
| 250   |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 255  |     |
| acc aag ctt gtg gag acc gcc atc cag tcc ctg gat gag ccc gga ggg             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1114 |     |
| Thr   | Lys | Leu | Val | Glu | Thr | Ala | Ile | Gln | Ser | Leu | Asp | Glu | Pro | Gly | Gly  |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 260 |
| 265   |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 270  |     |
| gct acc ttc ctc tca agt gcc aag cag ctc atc aag agc att gta gaa             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1162 |     |
| Ala   | Thr | Phe | Leu | Ser | Ser | Ala | Lys | Gln | Leu | Ile | Lys | Ser | Ile | Val | Glu  |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 275 |
| 280   |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 285  |     |
| gcc tcc aag ggc tgc cag ctg ggg aag aca gag caa ggc ttt gag aac             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1210 |     |
| Ala   | Ser | Lys | Gly | Cys | Gln | Leu | Gly | Lys | Thr | Glu | Gln | Gly | Phe | Glu | Asn  |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 290 |
| 295   |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 300  |     |
| atg gac tac ttt act ctg gac tta gaa cac ata gca gag gcc ttg agg             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1258 |     |
| Met   | Asp | Tyr | Phe | Thr | Leu | Asp | Leu | Glu | His | Ile | Ala | Glu | Ala | Leu | Arg  |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 305 |
| 310   |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 315  |     |
| 320   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |     |
| gcc att gac ttt ggg aca ggt aaa gga tgt gat gtt aca tgt ttg acc             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1306 |     |
| Ala   | Ile | Asp | Phe | Gly | Thr | Gly | Lys | Gly | Cys | Asp | Val | Thr | Cys | Leu | Thr  |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 325 |
| 330   |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 335  |     |
| ttt gaa agg cag cgt tcc tct tgagttctga ggggaactgt taaaaaaagtc               |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1357 |     |
| Phe   | Glu | Arg | Gln | Arg | Ser | Ser |     |     |     |     |     |     |     |     |      |     |
|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      | 340 |
| aaatttacac agccagtgtt gacaggtctc tctatggagc cctgactgtc tttagtagtgt          |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1417 |     |
| ctaagtagac caagctggtc tggAACACAT agAGATCTAT CTTGCCATC TCTGTTCTT             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1477 |     |
| gagggatgag ataaaaggca tggcccacc atgcctggct ccacagacaa ctttgtatg             |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1537 |     |

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Pro Leu Gln Lys Gly Ser His Pro Met Cys Lys Glu His Glu Asp Glu  
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Cys Lys Val Phe Gly Ala His Gln Ala Cys Glu Val Ala Pro Leu Gln  
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Leu Val Ala Gly Asn Asp Arg Val Gln Thr Ile Ile Ser Gln Leu Glu  
180 185 190  
  
Asp Ser Cys Arg Val Thr Lys Glu Asn Ser His Gln Val Lys Glu Glu  
195 200 205  
  
Leu Ser Gln Lys Phe Asp Thr Leu Tyr Ala Ile Leu Asp Glu Lys Lys  
210 215 220  
  
Ser Glu Leu Leu Gln Arg Ile Thr Gln Glu Gln Glu Lys Leu Gly  
225 230 235 240  
  
Phe Ile Glu Ala Leu Ile Leu Gln Tyr Arg Glu Gln Leu Glu Lys Ser  
245 250 255

Thr Lys Leu Val Glu Thr Ala Ile Gln Ser Leu Asp Glu Pro Gly Gly  
260 265 270

Ala Thr Phe Leu Ser Ser Ala Lys Gln Leu Ile Lys Ser Ile Val Glu  
275 280 285

Ala Ser Lys Gly Cys Gln Leu Gly Lys Thr Glu Gln Gly Phe Glu Asn  
290 295 300

Met Asp Tyr Phe Thr Leu Asp Leu Glu His Ile Ala Glu Ala Leu Arg  
305 310 315 320

Ala Ile Asp Phe Gly Thr Gly Lys Gly Cys Asp Val Thr Cys Leu Thr  
325 330 335

Phe Glu Arg Gln Arg Ser Ser  
340